REMARKS

Claims 1-14 are pending.

Rejection of Claims under 35 USC §103(a)

Claims 1-7 and 12-14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Fee et al. (U.S. Patent 6,650,842) in view of Berger et al (U.S. Patent 6,021,245). Claims 8-9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Fee et al in view of Berger et al in further view of Auracher (U.S. Patent 5,392,377). Claim 10 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Fee et al in view of Berger et al in further view of Kai (U.S. Patent 6,154,588). Finally, the Examiner has also rejected claims 11 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Fee et al in view of Berger et al in further view of Ford et al. (U.S. Patent 6,392,769).

The Applicant respectfully submits that, based on the Fee et al reference, all of the Examiner's claim rejections fail to establish a prima facie case of obviousness.

The Examiner states that Fee et al discloses "a dispersion compensation module DCM (64 fig. 7) and an optical amplifier (26, fig. 7), wherein the properties of the DCM are being selected to suppress four-wave mixing (col. 6, lines 6-15) rather than to provide complete chromatic dispersion compensation of the respective span (col. 6, lines 10-15)". Applicant respectfully disagrees.

Fee et al discloses an optical communication system in which dispersion compensators and optical amplifiers are alternately spaced from one another along a length of an optical fiber so as to reduce four-wave mixing and to increase the allowable spacing between optical amplifiers. In one solution taught by Fee et al,

> "a first dispersion compensator is located along an optical fiber between a transmitter and a first optical amplifier, with first dispersion compensator placed at some substantial distance prior to the first optical amplifier. This allows an optical carrier to be launched at a relatively high power into a fiber under dispersive conditions. A second dispersion compensator may be inserted into the fiber line at a point after the first optical amplifier where the high launch power

> has been eventually diminished by fiber attenuation and non-linearity of the fiber medium is no longer a problem. The second dispersion compensator brings the dispersion to a manageable value" (see column 2, lines 41-53).

Although Fee et al provide a solution to the problems posed by four-wave mixing in optical communication systems, the solution taught by Fee et al, as summarized above, is inherently different from the solution of claim 1. In particular, Fee et al teaches that

> "A first dispersion compensator 64 is provided between the transmitter 32 and the first amplifier 60 such that the chromatic dispersion is returned to zero at a point P_1 prior to the first amplifier 60, as shown at 66 in FIG. 8. After the first dispersion compensator 64, the chromatic dispersion slowly accumulates along the length of the fiber 34 due to the dispersive characteristics of the native fiber. As shown in FIG. 8, the optical signal is dispersively propagated during and immediately after amplification at amplifier 60 as shown at P_2. The optical amplifiers 60 each amplify the four optical carriers and launch them back into the fiber 32 at a relatively high power into dispersive conditions without generating four-wave mixing, as illustrated at 68 in FIG. 9" (see column 5, line 59 to column 6, line 5).

Thus, the dispersion compensators disclosed by Fee et al provide <u>complete</u> chromatic dispersion compensation. It is evident that Fee et al does not teach a dispersion compensation module (DCM) wherein "the properties of the DCM being selected to suppress four-wave mixing rather than to provide complete chromatic dispersion compensation of the respective span", as recited in independent claims 1 and 13. Furthermore, the Fee et al does not teach a method comprising "deliberately compensating in each span <u>only partially</u> for the chromatic dispersion introduced in that span such that four-wave mixing is reduced", as recited in independent claim 14 (emphasis added).

The Examiner also states that, "Fee does not specifically disclose the last DCM (last DC 64, fig. 7) has properties selected to substantially complete the chromatic dispersion compensation over the total length of the spans, or to completely compensate for the cumulative chromatic dispersion introduced by all the spans." The Examiner further states that

Berger teaches dispersion compensation for serial spans in an optical transmission system, wherein a dispersion compensation fiber completely compensates the accumulated dispersion. The Examiner concludes that "as it taught by Berger, it would have been obvious to a person of ordinary skill in the art at the time of the invention that dispersion compensation modules, such as dispersion compensation module 64 of Fee that is positioned at the last span can completely compensate the accumulated dispersion of all the spans to further provide an increaser in the transmission date rate an/or to increase the transmission distance." Applicant disagrees for at least the following reasons.

As stated earlier, the dispersion compensators disclosed by Fee et al are placed intermediate to optical amplifiers (see Fig. 7) and provide complete chromatic dispersion compensation as illustrated at points P_1, P_3 and P_5 (see Fig 8) within each span. Moreover, Fee et al teaches that "the chromatic dispersion P_6 at the receiver 38 is sufficiently low to allow the receiver photodiodes to receive the respective optical carriers and render a faithful electrical reproduction of data signals D1, D2, D3 and D4 at the respective output ports 46, 50, and 54" (see column 6, lines 44 to 49). Clearly, the system of Fee et al does not require a DCM, located immediately following a last span and connected thereto, having properties selected to substantially complete the chromatic dispersion compensation over the total length of the spans, as claimed herein. Since the chromatic dispersion at the receiver is sufficiently low, no one skilled in the art would be motivated to combine the teachings of Berger et al in order to provide a DCM having properties selected to substantially complete the chromatic dispersion compensation over the total length of the spans, or to completely compensate for the cumulative chromatic dispersion introduced by all the spans.

The Examiner states that, with respect to claim 14, "Fee discloses deliberately compensating in each span only partially for the chromatic dispersion in that span (col. 5, lines 55-66 and p1, p3, p5, fig.8) such that four-wave mixing is reduced". Applicant respectfully disagrees. Column 5 lines 61-62, recite, "such that the chromatic dispersion is returned to zero at a point P_1"; column 6 lines 19-20 recite, "to return the chromatic dispersion to zero at point P_3, as shown in Fig. 8"; and, column 6, lines 40-43 recite, "the chromatic dispersion continues to accumulate after the second amplifier 60, and is then returned to zero, or nearly zero, at P_5 by the third dispersion compensator 64". Clearly, the dispersion compensators of Fee et al provide for complete chromatic dispersion compensation and not partial compensation as recited in claim 14.

Furthermore, additional embodiments taught by Fee et al involve overcompensation of both the slope and absolute dispersion of the fiber (column 6, line 65 to column 8, line 9) and are thus inherently different from "partially compensating the chromatic dispersion" as claimed herein.

Based on the aforementioned discussion, Applicant respectfully submits that all of the Examiner's claim rejections fail to constitute a *prima facie* case of obviousness. Quoting from page 14 of the KSR Supreme Court Opinion "rejections on obvious grounds cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness….a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art". Applicant respectfully submits, that, as stated earlier, Fee et al does not teach a dispersion compensation module (DCM) wherein "the properties of the DCM being selected to suppress four-wave mixing rather than to provide complete chromatic dispersion compensation of the respective span", as recited in independent claims 1 and 13. Furthermore, the Fee et al does not teach a method comprising "deliberately compensating in each span only partially for the chromatic dispersion introduced in that span such that four-wave mixing is reduced", as recited in independent claim 14. To the contrary, the dispersion compensators disclosed by Fee et al provide <u>complete</u> chromatic dispersion compensation.

In any event, the system of Fee et al does not require a DCM, located immediately following a last span and connected thereto, having properties selected to substantially complete the chromatic dispersion compensation over the total length of the spans, as claimed in independent claims 1, 13, and 14. Therefore, a person implementing the system of Fee et al would not be required, let alone be motivated, to combine the teachings of Berger et al. Furthermore, Applicant notes that Fee et al would NOT want to include a DCM, located immediately following a last span and connected thereto, having properties selected to substantially complete the chromatic dispersion compensation over the total length of the spans (as recited at column 6, lines 44 to 49) to achieve the stated intent of reducing the required number of amplifiers and dispersion compensators for a given length of optical fiber. Accordingly, even if the references can be combined, the combination of references does not teach the claimed invention. Thus, Applicant submits that claims 1, 13, and 14, are not only

novel, they are also not obvious over the cited art. Claims 5-12 depend from claim 1 and are, therefore, also novel and inventive.

Accordingly, it is respectfully submitted that the above-mentioned rejections fail to establish a prima facie case of obviousness, by failing to provide and support an adequate motivation to combine the cited references to support the rejection, and by failing to teach or reasonably suggest all of the limitations of claims 1-14. Therefore, Applicant respectfully requests that the Examiner withdraw his rejections of claims 1-14 under 35 U.S.C. § 103(a).

No fee is believed due for this submission. However, Applicant authorizes the Commissioner to debit any required fee from Deposit Account No. 501593, in the name of Borden Ladner Gervais LLP. The Commissioner is further authorized to debit any additional amount required, and to credit any overpayment to the above-noted deposit account.

Respectfully submitted,

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